REMARKS

In the October 10, 1995 Office Action, the Examiner objected to the disclosure based on informalities, rejected several claims under 35 U.S.C. 112, second paragraph, rejected several of the claims under 35 U.S.C. 102, and rejected several of the claims under 35 U.S.C. 103. By this Amendment, Applicant has revised the disclosure to overcome the informality objection, and has revised some of the claims and added new claims to overcome the rejections and more distinctly claim the invention. Applicant respectfully submits that the claims, as amended, distinguish over the prior art and respectfully requests reconsideration of the Examiner's rejections.

Claim 1 has been amended to particularly describe the claimed subject matter by providing antecedent basis for "said firearm". Independent claims 1 and 12 have been amended to include the limitations of original dependent claims 4 and 13, respectively, and the movable mass of original dependent claims 5 and 14, respectively. Further, claims 1 and 12 have been amended to clarify that the movable mass is *resiliently biased toward the firing end of the firearm.* Support for the biasing limitation appears in Fig. 2 and throughout the specification, including page 5, lines 3-14.

Claims 10 and 17 have been amended to correct typographical errors. Claim 16 has been amended to depend from claim 15, in order overcome the indefiniteness rejection in paragraph 3 of the Office Action.

Claims 19-24 have been added. Claims 19 and 20, dependent from claims 1 and 14, respectively, have been added to include the limitation that the movable mass be *detached and free-floating*. Claim 21, dependent from claim 1, includes the limitation that the inertia switch further comprises a substantially cylindrical housing and a spring. Support for the limitations of claims 19, 20 and 21 appear in Fig. 2 and throughout the specification, including page 5, lines 3-14. Claim 22, dependent from claim 2, has been added to include the limitation that the display is positioned such that it is visible to a user of the firearm while firing away from the user. Support for the addition of claim 22 appears, for example, on page 7, lines 1-3 of the specification. Claims 23 and 24 are dependent from claims 11 and 18, respectively, and are supported on page 7, line 48, and other references to port 48 throughout the specification.

The Examiner rejected claims 1, 2, 4 through 9, 11 through 16, and 18 under 35 U.S.C. § 102 (a) as being anticipated by Sayre (U.S. Patent No. 5,406,730). As the Examiner is aware, however, anticipation can only be properly found where a single prior art reference shows each and every element of what is claimed. Applicant respectfully asserts that these claims, as amended, distinguish over Sayre for the reasons set forth below.

The Sayre patent discloses an ammunition counter with a dynamic recoil sensing switch in conjunction with an acoustic sensing switch, neither of which can operate to increment the counter independent of the other. Applicant's invention does not require the use of two separate and necessarily cooperating sensing switches, but merely utilizes a single inertia switch to count the rounds of ammunition fired. Applicant's elimination of an acoustic sensing switch reduces

the incidence of maintenance and repair associated with the two-switch configuration. With the two-switch configuration of Sayre, there is a greater opportunity for malfunction, breakage, need for parts, and need for adjustment, particularly because the two switches must cooperate in a short time-frame, approximately 1/20th of a second.

As now written, claim 1 requires that the movable mass be *resiliently biased toward the firing end of the firearm.* In the Sayre device, however, the metal piston (14) is resiliently biased in the opposite direction, namely, toward the *grip end*, by return spring (15) as illustrated in Figs. 3 and 6. This is a significant distinction. In the Sayre device, the spring (which is biased toward the grip end) has to be relatively weak so that the momentary contact will be made at the firing end of the inertia switch. (This concept is more fully described below.) Due to the spring's relative weakness, the chance of accidental contacts resulting from movement (but not firing) of the firearm is increased, thereby requiring the addition of a second, back-up sensing system (an acoustic sensing switch) to prevent false increments of the counter.

Because Applicant's device requires that the movable mass be resiliently biased toward the *firing end* of the firearm, the incrementing contact is made toward the grip end of the inertia switch. During recoil, the ball, which has relatively little axial space to move within the cylindrical housing of the inertia switch, moves rearwardly with the rest of the firearm. But even after the user's hand resists the rearward recoil of the firearm, the inertia of the ball causes it to continue moving rearwardly against the force of the stiff spring.

Sayre describes the operation of its dynamic recoil sensing switch in column 4, lines 30-35, as follows:

> "When the firearm is discharged, inertia forces said metal piston (14) to push against and overcome the pressure exerted by said return spring (15). Said metal piston (14) then comes into contact with said stator contact (12) for an instant, thus completing the circuit momentarily."

From the configuration of the piston (14) and spring (15), it is clear that the contact and circuit completion (which leads to the counting of a round) is achieved by the *actual* recoil movement of the firearm. For the purposes of this amendment, which distinguishes Applicant's claims over Sayre's disclosure, the two relevant movements made by the firearm are the rearward movement of the firearm immediately after firing, i.e., "actual" recoil, and the return forward movement of the firearm immediately after actual recoil, i.e., "felt" or "resisted" recoil.

When the Sayre firearm is fired it recoils in the direction of the grip end. The case (10) and attached spring of the dynamic recoil sensing switch (2) also move in a direction towards the grip end because the case is firmly secured to the firearm. However, the inertia of the initially stationary movable piston (14) causes the piston to remain substantially at rest, compressing the spring and forcing the contact (12) against the piston (14) to complete the circuit. The configuration of the biasing spring and piston prescribes that the contact be made during *actual* recoil. Again, note that the *contact* is positioned toward the firing end of the firearm, relative to the piston.

In Applicant's device, however, the contact is made on the grip end side of the movable mass. The contact and circuit completion (which leads to the counting of a round) is achieved by the force of the *felt* recoil in the user's hand or the rapid deceleration of the firearm that occurs when the firearm is held in the user's hand, i.e., the force of the user's hand against the recoiling firearm. If the recoil of the firearm was not resisted, then the device would not complete the circuit, and the firearm would not operate or cycle the next round of ammunition (in the case of many conventional semi-automatic type firearms). In other words, when the ammunition is fired, the firearm recoils toward the grip end. The housing of the inertia switch assembly 4 (including the ball 22) also recoils toward the grip end, and is stopped from continuing to move in that direction by the user's hand grip, which exerts a force against the firearm in the direction of the firing end. As an effect of the user's hand grip stopping the actual recoil movement of the firearm, inertia forces the ball 22 against the spring 24 to make the contact in the direction of the *grip end* of the firearm.

Therefore, the movable mass-and-contact configuration of Applicant's inertia switch, and mode of operation, are completely different from Sayre. While Sayre's dynamic recoil sensing switch is actuated by the actual recoil force, Applicant's inertia switch is actuated by the felt recoil force (or resistance-to-recoil) by the user's hand against the recoil of the firearm. That is why only a held or resisted firing firearm can actuate the required contact to change the counter in Applicant's device. Sayre does not teach or suggest an inertia switch that measures the *felt* or *resisted* recoil of the firearm. On the contrary, Sayre's dynamic recoil sensing switch

measures every recoil, resisted or not. In this regard, an advantage of Applicant's device over Sayre is a reduced risk of false counter activations.

In sum, the Sayre inertia switch measures the actual recoil of the firearm. Because the movable mass (piston) must, in a small distance, go from rest to a speed high enough to compress the spring and make a contact at the firing end of the inertia switch, the dynamic force available to activate the Sayre device is small, and consequently, the spring must be commensurately weak. Applicant's device, on the other hand, measures the felt recoil or the rapid deceleration (resistance to acceleration) of the firearm. The movable mass (ball) is accelerated to a maximum rearward velocity in conjunction with the recoiling firearm when the firearm begins its post-recoil rapid deceleration back toward the firing end of the firearm, as an effect of the user's hand stopping the rearward movement. Inertia results in the ball continuing to travel at a high velocity, thereby compressing the spring to make the contact and complete the circuit. Because the ball has accelerated to a maximum velocity when the firearm begins its rapid deceleration, the ball can overcome a much stiffer spring than the spring in the Sayre device. The use of a stiffer spring eliminates the risk of false activations and the need for a second sensor in Applicant's device. In contrast, because the Sayre inertia switch makes contact by relatively weak motion, it requires the second, sound-dependent switch to reduce the number of false activations.

The amendment to claim 1 clarifies the structural differences from Sayre which result in the unique way that Applicant's inertia switch operates, as described above. Applicant's claimed

requirement of a movable mass which is resiliently biased in the direction that the ammunition is discharged is not taught or suggested by the Sayre reference. Therefore, claim 1, as amended, and all of the claims dependent therefrom, are not anticipated by Sayre.

As now written, claim 11, which depends from claim 1, contains the additional limitation of a communication port. Therefore, unlike Sayre, Applicant's device has means for storing and accessing information from the microcontroller, via the port. Sayre, as well as the other cited patents, do not disclose the information memory capability nor the means for accessing information from the microcontroller, that is provided by the communication port in Applicant's device.

Dependent claim 22 requires that the display be positioned such that it is visible to a user of the firearm while firing in a direction away from the user. Sayre's patent teaches a display being flush with the firearm hand grip, a position which does not allow the user to view the display while properly firing. So while an object of Applicant's device is to allow the user to see the number of shots left in the firearm *while firing*, Sayre does not suggest placing the display in view while firing. The object of Sayre is to allow "the user to check the amount of remaining ammunition *without the need to physically remove* the magazine of a semi-automatic pistol *or check the cylinder* of a revolver. . . " (See Sayre, column 1, lines 32-37.) As such, added claim 2 is also not anticipated or rendered obvious by Sayre.

Further, as now written, dependent claim 19 requires a *detached and free-floating* movable mass as part of the inertia switch. In the preferred embodiment, the movable mass is a ball which is not attached to any other part of the inertia switch assembly. It can move freely, but is, of course, confined to its surroundings which, in the preferred embodiment, are a cylindrical housing, a contact at the firing end of the cylinder, and a stiff spring at the grip end of the cylinder. The Sayre device does not disclose, teach, or suggest the use of a detached, free-floating movable mass in its inertia switch. On the contrary, the "dynamic recoil sensing switch" of Sayre is "electrically connected to the rest of the circuit *by a wire* (17)", as disclosed in column 2, lines 51-56.

Applicant's free-floating ball configuration is superior to Sayre's wire assembly because of the inherent weakness in the connection of the wire lead (17) to the metal piston and the risk of wire breakage for the size constraints given. The Sayre device does not indicate the means of attachment used between the wire lead (17) and the metal piston (14). Nonetheless, due to the required thinness of the wire and the inherent weakness of wire attachment, generally, the Sayre sensor may not be suitable for repeated and/or extended use. Because Applicant's device utilizes a free-floating ball, it eliminates the chance of separation or breakage associated with a wire connection. The circuit contact in Applicant's device is made be the spring or the housing itself, eliminating the need for any wires.

The Examiner has also rejected claims 1, 4 through 7, and 12 through 14 as being anticipated by Blomerius (U.S. Patent No. 2,152,947). While some of the objects of Blomerius' and Applicant's devices may be similar, the two devices are completely different, structurally. Some of those differences are clarified by the amended claims already described herein.

Blomerius describes a switching apparatus for electrically counting rapid reciprocating movements, but due to its mechanical parts that are slapping circuit contacts together, it would not be suitable for the rapid movements (approximately one contact every 1/10 of a millisecond) of an automatic firearm over an extended period of time. Blomerius utilizes multiple fully attached rods and abutment members, not a ball and spring configuration, in order to close contacts to send signals via a closed circuit to means for counting the number of shots fired. Nowhere does the Blomerius reference disclose or suggest Applicant's inertia switch with its simple, movable mass which is resiliently biased toward the firing end of the firearm as claimed in amended claim 1. Like Sayre, Blomerius requires the use of two circuits - a lamp circuit and a counter circuit, each with separate pairs of contacts. The lamp circuit appears to indicate to the user whether the gun must be cocked before firing. The user is alerted that the gun needs to be cocked before firing when the lamp is not burning. This function would be easily defeated by a burned light bulb.

When a shot is fired and when part of a recoiling gun reaches its rear end position, the counter circuit is closed by an abutment member which forces a seemingly flexible contact against a second contact. The counter circuit, however, is prevented from being restored to its

normal inoperative condition during the return or forward movement of the gun part, by a locking device which is not released until the moving gun part has fully returned to its forward end position. Success of the Blomerius device is also dependent upon a lamp circuit and an electric lamp burning at appropriate times, as described in column 2, lines 30-46. Needless to say, lamps burn out and the usefulness of the Blomerius device is circumscribed, accordingly.

The resulting increased complexity of the Blomerius device is overcome by Applicant's simple one-circuit/one-contact device. Blomerius does not suggest that a firearm monitoring device can successfully count the ammunition left in the firearm without the increased complexity of dual circuits, a lamp, and multiple rods and abutment members, as accomplished by Applicant. From structural, wear, maintenance, and simplicity standpoints, Applicant's device is clearly distinguishable from Blomerius' with its multiple contacts, circuits, mechanical arms, rods, and abutment members.

Based on the above, Applicant submits that amended claim 1 and all of the claims depending therefrom are not anticipated or rendered obvious by Blomerius.

Finally, Applicant respectfully submits that Sayre teaches away from Applicant's device, as evidenced by the opposite positioning of his inertia switch, his use of the actual recoil (rather than the resisted or felt recoil) as means for making the inertia switch contact, and his need for a second sensor. Furthermore, the Blomerius reference does not disclose or suggest Applicant's

inertia switch assembly. As such, Applicant maintains that no proper combination of these cited references would achieve the claimed structure, and therefore, none of Applicant's claims are obvious.

The Examiner has also rejected several of the claims under 35 U.S.C. §103 as being obvious in view of prior art. While it is true that several prior art references can be combined in order to render a claim obvious to one having ordinary skill in the art, Applicant respectfully asserts that the claims, as amended, are not obvious based upon the references cited by the Examiner.

Particularly, the Examiner has rejected claims 1, 2, 8 through 12, and 15 as being unpatentable over Horne et al (U.S. Patent No. 5,005,307) in view of Arter (U.S. Patent No. 1,324,098), and has rejected claims 1 through 3, 8, 9, 11, 12, 15, 16, and 18 as being unpatentable over Horne et al in view of Guild. The limitation of original dependent claim 4, including the limitation of an inertia switch, which was not rejected based on obviousness, has now been incorporated as a limitation in both of the amended independent claims, claims 1 and 12. Consequently, Applicant submits that the obviousness rejections have been overcome.

In addition to not disclosing an inertia switch, the counting aspect of Horne et al. is dependent upon a slide switch which decrements the count of cartridges by one, each time the slide of the firearm slides rearwardly, and a magazine switch which resets the count to eight each time a magazine is inserted into an empty firearm. One problem associated with the Horne

et al device is that magazines are often accidentally ejected from the firearm. In such situations, where the user would want to re-insert the partially expended magazine, re-insertion of the magazine would cause the counter to increment by eight, giving the user a false cartridge reading on the display. Another problem associated with the Horne et al device is that it is not readily adaptable for each type of handgun, nor can a single design of the device possibly fit substantially all types of handguns which are available. For example, the Horne et al device cannot be easily adapted to revolvers, which do not have slides.

It is the Examiner's position that, although Horne et al. does not disclose that the second means maintains a total count of the number of first signals, Arter teaches means for maintaining a total count of signals received which would have been obvious to combine with the Horne et al. device to maintain a total count of signals for the purpose of accurate maintenance records. Although it is true that Arter discloses a tachometer arranged to record a daily total of projectiles, once the daily total mechanism is restored to zero, it can no longer be retrieved. As claimed in amended claim 11, however, Applicant's microcontroller has memory and access capabilities which can store and retrieve previous daily totals, as well as other data. These aspects are not taught or suggested by Arter.

Applicant maintains that the additional limitation of an inertia switch to both of the independent claims 1 and 12 overcomes the Examiner's obviousness rejections, and further submits that the invention in amended claim 11 would <u>not</u> be obvious in view of the prior art for the reasons stated.

Based on the above, Applicant respectfully requests the Examiner to favorably reconsider and allow all of the claims, in their present form. Applicant has attached herewith a check for $55.00 to cover the one-month extension fee. No additional fees are believed to be required at this time. Any deficiency or overpayment of fees for this Amendment should be charged or credited to Deposit Account No. 06-2226.

Respectfully submitted,

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